

Amendments to the Claims

1. (Currently Amended) A method of mixing predetermined volumes of two or more liquids in microfluidic devices comprising:

(a) dispensing at least a first liquid volume from a first liquid well and a second liquid volume from a second liquid well into a first chamber to form combined liquid volume;

(b) discharging said combined liquid volumes of (a) from said first chamber into a second chamber via one capillary passageway or via two or more separated capillary passageways, to complete mixing of the volumes of said combined liquids.

2. (Currently Amended) A method of mixing liquids of Claim 1 wherein said combined liquid volumes of (a) is discharged into said second chamber through two or more separated capillary passageways.

3. (Currently Amended) A method of mixing liquids of Claim 2 wherein said combined liquid volumes of (a) is discharged into said second chamber through at least three separated capillary passageways.

4. (Currently Amended) A method of mixing liquids of Claim 1 wherein said combined liquid volumes of (a) discharged into said second chamber is discharged into liquid communication with at least a third chamber through one capillary passageway or via two or more separated capillary passageways.

5. (Original) A method of Claim 1 wherein said combined liquid of (a) is discharged into said second chamber in the form of droplets.

6. (Currently Amended) A method of Claim 1 wherein said first chamber has a volume of at least about twice that of the combined liquid volumes of (a).

7. (Currently Amended) A method of Claim 1 wherein said second chamber has a volume of at least about twice that of the combined liquid volumes of (a).

8. (Currently Amended) A method of Claim 6 wherein said first chamber has a depth of at least about twice that required to hold the combined liquid volumes of (a).

9. (Currently Amended) A method of Claim 7 wherein said second chamber has a depth of at least about twice that required to hold the combined liquid volumes of (a).

10. (Currently Amended) A method of Claim 1 wherein a space of at least 100 μm is provided above the level of the combined liquid volumes of (a) in the first chamber.

11. (Currently Amended) A method of Claim 1 wherein a space of at least 100 μm is provided above the level of the combined liquid volumes of (a) in the second chamber.

12. (Currently Amended) A method of Claim 1 wherein said capillary passageways have cross-sectional dimensions of 1 to 2000 μm .

13. (Currently Amended) A method of Claim 12 wherein said capillary passageways have cross-sectional dimensions of 200 to 1000 μm .

14. (Previously Presented) A method of Claim 1 wherein said capillary passageways have lengths of 0.5 to 100 mm.

15. (Previously Presented) A method of Claim 14 wherein said capillary passageways have lengths of 1 to 50 mm.

16. (Previously Presented) A method of Claim 3 wherein three or more separated capillary passageways are in liquid communication between said first and second chambers.

17. (Original) A method of Claim 1 wherein at least one of said first and second chambers contains steps or ramps to assist mixing of said combined liquids.

18. (Currently Amended) A method of Claim 1 wherein said combined liquid[[s]] volumes of (a) in said at least one capillary passageway is [[are]] discharged with a velocity of at least 1 mm/sec.

19. (Original) A method of Claim 1 wherein said first and second liquids are dispensed from wells into said first chamber through capillary passageways.

20. (Currently Amended) A method of Claim 1 wherein the completely mixed combined liquid[[s]] [[are]] volumes of (a) is thereafter moved to downstream chambers for further processing.

21. (Currently Amended) A microfluidic device comprising:

- (a) a first chamber for receiving and combining at least a first liquid volume from a first liquid well and a second liquid volume from a second liquid well;
- (b) a second chamber for complete mixing of said at least first and second liquid[[s]] volumes, said second chamber being in liquid communication with said first chamber via one capillary passageway or via two or more separated passageways.

22. (Previously Presented) A microfluidic device of Claim 21 wherein said first and second chambers are in liquid communication through two or more separated capillary passageways.

23. (Currently Amended) A microfluidic device of Claim 22 wherein said first and second chambers are in liquid communication through at least three separated capillary passageways.

24. (Previously Presented) A microfluidic device of Claim 21 wherein said second chamber is in liquid communication with at least a third chamber through one capillary passageway or two or more separated capillary passageways.

25. (Currently Amended) A microfluidic device of Claim 21 wherein said first chamber has a volume of at least about twice that of the combined volume of said first and second liquid[[s]] volumes.

26. (Currently Amended) A microfluidic device of Claim 21 wherein said second chamber has a volume of at least about twice that of the combined volume of said first and second liquid[[s]] volumes.

27. (Currently Amended) A microfluidic device of Claim 25 wherein said first chamber has a depth of at least about twice [[the]] that required to hold the combined volume of said first and second liquid[[s]] volumes.

28. (Currently Amended) A microfluidic device of Claim 26 wherein said second chamber has a depth of at least about twice that required to hold the combined volume of said first and second liquid[[s]] volumes.

29. (Currently Amended) A microfluidic device of Claim 21 wherein a space of at least 100 μm is above the level of said combined first liquid and second liquid volumes in the first chamber.

30. (Currently Amended) A microfluidic device of Claim 21 wherein a space of at least 100 μm is above the level of said combined first liquid and second liquid volumes in the second chamber.

31. (Previously Presented) A microfluidic device of Claim 21 wherein said capillary passageways have cross-sectional dimensions of 1 to 2000 μm .

32. (Previously Presented) A microfluidic device of Claim 31 wherein said capillary passageways have cross-sectional dimensions of 200 to 1000 μm .

33. (Currently Amended) A microfluidic device of Claim 21 wherein said capillary passageways have lengths of 0.5 to 100 mm.

34. (Previously Presented) A microfluidic device of Claim 33 wherein said capillary passageways have lengths of 1 to 50 mm.

35. (Previously Presented) A microfluidic device of Claim 21 wherein three or more separated capillary passageways are in liquid communication between said first and second chambers.

36. Canceled.

37. (Previously Presented) A microfluidic device of Claim 21 wherein at least one of said first and second chambers contains microstructures to assist mixing or removal of said first and second liquids.

38. (Original) A microfluidic device of Claim 21 wherein said first chamber is in liquid communication through capillary passageways with wells containing said at least first and second liquids.

39. (Original) A microfluidic device of Claim 21 wherein said second chamber contains means for preventing premature movement of said liquids before mixing is complete.

40. (Previously Presented) A microfluidic device of Claim 22 wherein said two or more capillary passageways have different diameters.

41. (Previously Presented) A microfluidic device of Claim 22 wherein said two or more capillary passageways are disposed so as to cause liquid streams or droplets exiting from said passageways to impinge as said liquid streams or droplets enter said second chamber.

42. (Previously Presented) A microfluidic device of Claim 22 wherein said two or more capillary passageways are manifolded before entering said second chamber.

43. (Previously Presented) A microfluidic device of Claim 21 wherein said passageways have hydrophilic surfaces.